

SPECIFICATION

Clamp device for holding the edges of panels

The invention relates to a device for holding that edge of panels, particularly insulating mats, which extends along an air-conducting passage of a frame piece of a prefabricated gland, where the metallic frame piece has a strip or plate which runs inside the appropriate wall of the air-conducting passage, butting against the latter. A stay is provided to connect rigidly on a further strip or plate of the frame piece resting on the outside of the wall.

Air-conducting passages of this type are known, e.g. through US Patent 3,712,650. The shape of the frame pieces is likewise known from this. The prefabricated glands are inserted on the front face of an air-conducting passage and then connected there to the walls of the air-conducting passage with the aid of cross-connections. These stays are usually spot-welded, but sometimes they are attached by screws or rivets.

Two prefabricated glands each butt against each other, where a sealing strip is also added between their strips standing perpendicularly to the wall.

The gland may, however, not be restricted to use to a ventilating system.

Such air-conducting passages may have cross-section dimensions in the region of several decimetres to several metres. For reasons of sound insulation and/or heat insulation, it is sometimes necessary to cover the insides of the walls with insulating mats. Fastening of the mat to a prolonged part of the passage presents no considerable difficulty. The insulating mats usually have a relatively resistant skin on both sides and the material situated in between is very loose. With this skin, the insulating mats can be fastened, e.g. cemented to the inside of the walls.

The skin of the insulating mat cannot, however, be cemented at the point where the inner strip of the frame piece is situated. Nevertheless, they must be held there correctly from the point of view of flow technology, refrigeration technology and sound technology.

An object of the invention is to provide such a device which allows the advantages of prefabricated glands to exist, does not make re-thinking obligatory, is inexpensive, makes it possible to work without special tools and gives the edges good stability even with high flow speeds, whether it be on the upstream or downstream-located side. Good air-flow, sound and thermal properties must be retained.

According to the invention we provide a device for holding the edge of insulating mat for extending transversely to the longitudinal direction of an air-conducting passage, comprising a metal frame piece having a strip or plate which runs inside the appropriate wall of the air-conducting passage, lying against the latter, and a stay which connects in a rigid manner a second strip or plate of the frame piece for resting on the outside of the wall to said first strip, wherein the inner strip is

bent back on itself to form a pocket, the pocket has a catch strip which runs transversely over the entire length of the pocket and points towards the inner strip, a holding strip composed of plastic is provided, the heat-conducting value of which lies considerably below that of the metal of the frame piece, having a width sufficient to accommodate the edge of the insulating mat, one piece of the holding strip having a catch strip, which is complementary to the catch strip of the pocket capable of insertion into the pocket by flexible deformation.

The insulating mat is thereby prevented from being partly blown away or possibly being inflated like a bag. The frame piece even gains in rigidity. The normal sheet metal rolling process can be used for manufacturing it, as hitherto. Supplementary expenditure is minimal.

A wall of the pocket facing the strip and formed from the latter extends from the inner edge of the inner strip. In this manner it is possible to manage with a minimum of material and a minimum of rabbetings.

The wall extends at least as far as the stay on the inner strip. The cross-section is thereby additionally used to reduce the spring constant considerably in relation to forces in the opening direction. The pocket can then spring open, only just to the extent that the catch strip presses the one piece of the holding strip constantly in an outwardly direction into abutment against the pocket wall.

The wall has a Z shaped corner moulding disposed beyond the stay. The transition into the floor of the pocket is thus obtained by simple means and the pocket is made to open outwardly.

The catch strip of the pocket is provided at the free end of the wall. The flexible properties of the one wall are fully utilized, and in a case where the pocket is outwardly open, the catch strip of the holding strip is retained at an advantageous point, namely the outer area.

By forming the catch strip as a V shaped groove a good toothing is ensured, a catching flank is produced and the catch strip has a reinforcing resistance moment.

The provision of several V shaped grooves enables the holding strip to be brought initially into a first catch position and the edge of the insulating mat can be held one piece distant, without the holding strip falling out. It is then possible to pass to the next catch step and hold the edge once again, until it has finally been completely retained.

The holding strip may have a V shaped profile so that a simple holding strip which can be easily extruded, which has a high resistance moment itself, which with its outer piece easily fits the outer contour of the insulating mat, whose cross-piece can be shaped so easily that there is practically no spacing between it and the adjacent cross-piece, and which, with a flat cross-piece, also offers a sufficiently large impact surface which is not equally flexible when a hammer is used for working, because the specific surface

pressures are small.

The catch strip of the holding strip is 0.5 to 1 times as wide as the outer strip of the holding strip. The material consumption for the holding strip may be reduced, insofar as the holding strip is narrower than the outer strip, and the catch strip is sufficiently long on the other side to be able to absorb any possible bending stresses during transport or in operation.

The transverse strip of the holding strip in the ready-assembled state is set back slightly inwards in relation to an outer strip of the frame piece standing perpendicularly to the wall, whereby the ready-assembled passage can be transported in the normal way without running the risk of its resting unintentionally on the plastic holding strips.

By spot welding no additional measures are required in order to make the pocket resistant to deflection forces.

The invention will now be described by way of example with reference to the accompanying drawings:

FIGURE 1 shows a cross-section through a preferred exemplified embodiment in its edge region,

FIGURE 2 shows a diagrammatic representation of a further exemplified embodiment, and

FIGURE 3 shows a diagrammatic representation of a third exemplified embodiment.

An air-conducting passage 11 has four sheet-metal walls 12. At the end of it there are frame pieces 13 composed of endlessly rolled sheet-metal which extend parallel to the edge 14 of the wall 12 and are joined together by four angle brackets whose pieces 16 are fixed into the frame pieces 13.

Each frame piece has an inner strip or plate 17, which extends along the inside, butting against the wall 12. The strip 17 runs after a 90° bend into a strip 19, which stands perpendicularly to the appropriate wall 12, and against which on the inside the one surface of a piece 16 butts in the corner area of the prefabricated gland. After a bend 21 of approximately 90°, the strip 19 runs into a narrow cross-stay 22. The latter runs after a further bend through approximately 90° into a stay 23, which runs parallel to the strip 19. After this, there follows after a 45° bend 24, a sloping stay 26, and the latter, after a 45° bend, runs into a cover stay 27, against the outside of which the appropriate wall 12 butts and which has an insertion slope 28 for the wall 12 at its end.

The stay at its inner end runs into a bend 29 of 180°, after which a down bend 31 follows. In detail, the down bend 31 has a stay 32, which is roughly half as wide as the strip 17. A Z-shaped corner moulding 33 connects to the outside of the stay 32, whereby the floor of a pocket 34 is formed. After the Z-shaped corner moulding 33 follows an outwardly pointed catch strip 36, which runs substantially parallel to the strip 17 and at its outer end has a V shaped groove 37, whose tip 38 points towards the strip 17 but leaves a spacing of

approximately 1.5 mm between the latter.

The V shaped profile 37 has on the outside a wing 39, which is considerably longer than the other wing forming the V shaped profile 37, and whose surface 41 pointing towards the pocket 34 is a catch surface. The wing 39 has an outwardly pointed tip 42. The latter has a definite minimum spacing from the geometrical surface which can be placed in the outside of the stay 19.

A holding strip 43 is endlessly injection-moulded from plastic and has a considerably smaller heat-conducting resistance than the parts which have been discussed up to now. It has a roughly 25 mm wide outer strip 44, which at its inwardly pointed end runs into a slope 46. The unreduced material of the holding strip 43 is 2 mm thick.

At its outer end, the outer strip 44 runs into a flat cross-strip 47, whose outside is set back by roughly 1 mm in relation to the geometrical surface which can be covered by the outside of the strip 19. This dimension is correct when the inside of the cross-strip 47 touches the tip 42.

The roughly 15 mm wide cross-strip 47 then runs after a 90° angle into a catch strip 48. This fits in the pocket 34. At its free end the catch strip 48 has an inwardly pointing slope 49 which, during assembly, cooperates with the surface 41. The slope 49 runs into a point on the inside. The outside of the catch strip 48 butts against the inside of the strip 17, and to that extent this forms the one wall of the pocket 34. Roughly in the half of the catch strip 48 facing the cross-strip 47 there are provided several V shaped grooves 51 and 52, which are complementary to the V shaped profile 37. A welding spot 55 extends transversely through the cover stay 27, the wall 12, the strip 17 and the stay 32. This lies relatively close to the Z shaped corner moulding 33, so that the catch strip 36 becomes a relatively hard spring and the bend 29 does not serve as a flexible pivoting point. With correct dimensioning, the V shaped groove 37 in its caught state next to the V shaped strip 52, presses the catch strip 48 forcefully against the strip 17.

An insulating mat 53 has an inner skin 54 and an outer skin 56. The latter is cemented to the wall 12 from the inside, with the exception of the area which is situated in the region of the frame piece 13. Between the inner skin 54 and the outer skin 56 there is loose insulating material. The outer edge 58 of the insulating mat 53 is inserted into the space which is formed by the outer strip 44, the cross-strip 47 and the catch strip 36. The edge 58 can be firmly cemented, but it is sufficient for it to be plugged in at this point. As Figure 1 shows, the edge 58 must be slightly compressed here, because other layers of different structural elements also lie between the wall 12 and the outside 44 and intentionally take up some space.

The circular bend 29 and the Z shaped corner moulding 33 ensure that the outer skin 56 has a smooth course.

The exemplified embodiments as per Figures 2 and 3 are in fact also possible, but are technically

not so elegant as the exemplified embodiment as per Figure 1.

In Figure 2, the bend 59 begins at the outer edge of the strip 17, and the pocket 61 is inwardly open here. The floor of the pocket 61 and the catch strip of the pocket 61 must be double-layer-rolled here—if manufacture from a coil is desired.

The holding strip 62 also present here is inwardly open, but requires the special shape which can be seen from Figure 2 in order to be able to engage in the pocket 61.

Figure 3 shows a similar specific embodiment to Figure 2, but with less consumption of metal. Here—as in the first exemplified embodiment—the stay 63 on its inner edge runs into a bend. A stay 64 is then rolled back onto it, and thereafter follows the formation of the pocket 66. This exemplified embodiment is slightly better to roll than that of Figure 2.

20 CLAIMS

1. A device for holding the edge of insulating mat for extending transversely to the longitudinal direction of an air-conducting passage, comprising a metal frame piece having a strip or plate which runs inside the appropriate wall of the air-conducting passage, lying against the latter, and a stay which connects in a rigid manner a second strip or plate of the frame piece for resting on the outside of the wall to said first strip, wherein the inner strip is bent back on itself to form a pocket, the pocket has a catch strip which runs transversely over the entire length of the pocket and points towards the inner strip, a holding strip composed of plastic is provided, the heat-conducting value of which lies considerably below that of the metal of the frame piece, having a width sufficient to accommodate the edge of the insulating mat, one piece of the holding strip having a catch strip, which is complementary to

40 the catch strip of the pocket capable of insertion into the pocket by flexible deformation.

2. A device as claimed in claim 1, wherein a wall of the pocket facing the strip and formed from the latter extends from the inner edge of the inner strip.

3. A device as claimed in claim 1 or 2, wherein the wall extends at least as far as the stay on the inner strip.

4. A device as claimed in claim 2, wherein the wall has a Z shaped corner moulding disposed beyond the stay.

5. A device as claimed in claim 2, 3 or 4, wherein the catch strip of the pocket is provided at the free end of the wall.

6. A device as claimed in any one of the preceding claims, wherein the catch strip of the pocket is formed by a V shaped profile.

7. A device as claimed in claim 6, wherein one piece of the holding strip has several parallel V shaped grooves each of which fit the V shaped profile.

8. A device as claimed in any one of claims 1 to 6, wherein the holding strip has a V shaped groove.

9. A device as claimed in any one of the preceding claims, wherein the catch strip of the holding strip is 0.5 to 1 times as wide as the outer strip of the holding strip.

10. A device as claimed in any one of the preceding claims, wherein the transverse strip of the holding strip in the ready-assembled state is set back slightly inwards in relation to an outer stay of the frame piece standing perpendicularly to the wall.

11. A device as claimed in any one of the preceding claims, wherein the stay is a spot weld.

12. A device for holding the edge of an insulating mat along the wall of an air (gas) duct, substantially as described with reference to any of the examples illustrated in the drawings.



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